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IN THE CLAIMS:

Claims 1-23 (Cancelled)

24. (Currently Amended) A method executed in a receiver for maximum a posteriori (MAP) decoding of an input information sequence,  $X$ , that includes steps of receiving a signal, forming a received sequence  $Y$ , decoding the received sequence, and outputting a decoded result, where the decoding is characterized by:

iteratively maximizing an auxiliary function that includes a product of elements  $p_{ij}(X, Y)$  of a probability distribution matrix  $P(X, Y)$

where the input information signal travels through a channel represented by a Hidden Markov Model (HMM) to reach said receiver, and said auxiliary function is proportionally related to  $\prod_{i=1}^T p_{i-1,i}(X_i, Y_i)$  where  $p_{ij}(X, Y) = \Pr(j, X, Y | i)$ , are conditional probability density functions of an information element  $X$  of information sequence  $X$  that corresponds to a received element  $Y$  of sequence  $Y$  after the HMM transfers from a state  $i$  to a state  $j$

25. (Currently Amended) A receiver including at least one processor and an associated memory that contains instructions for said at least one processor that, when executed a received sequence of information, perform process steps that combine to effect maximum a posteriori (MAP) decoding of the received sequence to identify a sent sequence, which decoding comprises the steps of:

iteratively generating a sequence of one or more decode results starting with an initial decode result; and

outputting one of adjacent decode results as a decode of the input information sequence if the adjacent decode results are within a compare threshold, wherein the step of iteratively generating comprises:

- a. generating the initial decode result as a first decode result;
- b. generating a second decode result based on the first decode result and a model of the channel;

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- c. comparing the first and second decode results;
- d. replacing the first decode result with the second decode result; and
- e. repeating b-d if the first and second decode results are not within the compare threshold.